



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/595,920	05/19/2006	Ken Sawabe	SOE10021	9014
24203	7590	12/11/2008	EXAMINER	
GRIFFIN & SZIPL, PC			WALKE, AMANDA C	
SUITE PH-1			ART UNIT	PAPER NUMBER
2300 NINTH STREET, SOUTH				1795
ARLINGTON, VA 22204				
MAIL DATE		DELIVERY MODE		
12/11/2008		PAPER		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/595,920	Applicant(s) SAWABE ET AL.
	Examiner Amanda C. Walke	Art Unit 1795

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
 - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
 - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED. (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 10 September 2008.
- 2a) This action is FINAL. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1,3-20 and 23-26 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 1,3-20 and 23-26 is/are rejected.
- 7) Claim(s) _____ is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date: _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date: _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claim 1, 3-20, and 23-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ohta et al (US 5,476,690) in view of Grubb (US 3,647,467).

With respect to claims 1-6, and 10-20 Ohta et al. discloses a process for preparing a printed circuit board that comprises a light-sensitive resin composition that comprises:

- A. a high molecular weight binder having an acid value of 10 to 46 mg KOH/g (column 4, lines 5-10), a molecular weight between 20,000 and 2000,000 column 5, lines 41-46 and Synthetic Example 4 – column 10, lines 15-21) and in amounts of 40 to 80 parts per weight (column 6, lines 24-26). The binder comprises methacrylic acid or acrylic acid with monomers such as various (meth)acrylic acid ester and styrene or styrene derivatives. The reference provides a small list of options, therefore it would have been obvious to choose both a styrene and a (meth)acrylic acid ester;
- B. a compound having a least two polymerizable unsaturated double bond, such as bisphenol A (column 5, lines 55-59), in amounts of 20 to 60 parts by weight (column 6, lines 26-30); and

C. a photopolymerization initiator, such as a 2,4,5-triarylimidazole dimer (column 6, lines 13-21), in amounts of 0.1 to 10 parts by weight with respect to content of A and B (column 6, lines 31-33).

Ohta et al. further discloses forming a layer of the light-sensitive resin composition of claim 1 onto a substrate (support) (column 6, lines 44-49). However, Ohta et al. does not disclose the compound of formula (1a), (1b), (1c), or (2) of instant claim 1.

Grubb discloses a photoactivatable composition comprising: A binder polymer (column 10, lines 51-75)

- A photopolymerizable compound with at least one ethylenically unsaturated bond (column 12, lines 29-42);
- A photopolymerization initiator such as such as a 2,4,5-triarylimidazolyl dimer (column 3, lines 66-69); and

A heterocyclic sensitizing compound selected from: 2,5-diphenylfuran, 2,5-diphenyl-3,4-dimethylfuran, 2,5-diphenyl-3-ethylfuran, 2,5-di(p-methylphenyl)furan, 2,5-di(2,4-dimethylphenyl)furan, 2,5-di(p-butylphenyl)furan, 2,5-di(p-benzylphenyl)furan, 2-phenyl-5-(p-biphenyl)furan, 2,5-di(p-biphenyl)furan, 2-phenyl-5-(α -naphthyl)furan, 2,5-diphenyloxazole, 2,5-diphenyl-3-methyloxazole, 2,5-di(p-isopropylphenyl)oxazole, 1,4-bis(2-(5-phenyloxazolyl))benzene, 1,4-bis(2-(4-methyl-5-phenyloxazolyl))benzene, 2-phenyl-5-(p-biphenyl)oxazole, 2-phenyl-5-(α -naphthyl)oxazole, 2,5-di(α -naphthyl)oxazole, 1,4-bis(2-(5-phenyloxazolyl))naphthalene, 2,5-di(α -naphthyl)-1,3,4-oxadiazole, 2-phenyl-5-(α -naphthyl)-1,3,4-oxadiazole, 2,5-di(t-butylphenyl)-1,3,4-oxadiazole, 2,5-di(4-methyl-1-naphthyl)-1,3,4-oxadiazole, 2-

phenyl-5-(p-biphenylyl)-1,3,4-oxadiazole, 2-(4-biphenylyl)-5-(4-t-butylphenyl)-1,3,4-oxadiazole, and 1,4-bis(2-(5-phenyl-1,3,4-oxadiazolyl))benzene (column 3, lines 31-48). These heterocyclic compounds are used with the initiator to absorb at wavelengths that are not absorbed by the initiator (column 2, lines 17-20). The heterocyclic compounds are useful as light actuated photooxidants ad which can significantly increase the compositions total absorption of usable light during exposure (column 3, lines 57-64) and further provide better optical quality and imaging speed than commercial radiation sources (column 1, lines 44-54).

Therefore, it would have been obvious to one of ordinary skill within the art at the time of the invention to include the uses of a heterocyclic compound as disclosed by Grubb within the light sensitive resin composition of Ohta et al. to improve optical quality, light absorption and imaging speed.

With respect to claims 6 and 16-19, Ohta et al. further discloses forming a layer of the light-sensitive resin composition of claim 1 onto a substrate (support) (column 6, lines 44-49).

With respect to claim 7, Ohta et al discloses a method of forming a negative pattern comprising:

- A. laminating a light-sensitive element that consist of a layer of the light-sensitive resin composition onto the surface of the substrate (column 7, lines 1-3);

- B. imagewise irradiating the light sensitive composition with active light (column 7, lines 16-26); and
- C. developing the substrate (column 7, lines 55-57)

With respect to claim 8, Ohta et al further discloses a process for preparing a printed circuit board by electroless copper plating by using the negative pattern of the light-sensitive resin composition (column 8, lines 11-18) as formed in claim 7.

3. Claim 1, 3-6, 10-20, and 23-26 rejected are under 35 U.S.C. 103(a) as being unpatentable over Amanokura et al in view of Grubb and Ohta et al.

With respect to claims 1-6, and 10-20 Amanokura et al. discloses a process for preparing a printed circuit board that comprises a light-sensitive resin composition that comprises:

- A. a high molecular weight binder having an acid value of 50-77 KOH/g (see Synthesis Examples 4, 6 and 7, columns 21 and 22), a molecular weight between 30,000 and 100,000 (column 14, lines 9-11) and in amounts of 20 to 90 parts per weight (column 15, lines 12-24);
- B. a compound having ethylenically unsaturated double bond, such as 2,2-bis(4-methacryloxyethoxyphenyl) propane, 2,2-bis(4-acryloxyethoxyphenyl) propane and bisphenol A (column 14, lines 14-27), in amounts of 5 to 80 parts by weight (column 15, line 15); and

C. a photopolymerization initiator, such as a 2,4,5-triarylimidazole dimer (column 14, lines 54-67), in amounts of 0.1 to 10 parts by weight with respect to content of A and B (column 15, lines 16-17).

However, Amanokura et al. does not disclose the use of a compound of formula (1a), (1b), (1c), or (2) of applicant's claim 1.

Grubb discloses a photoactivatable composition comprising: A binder polymer (column 10, lines 51-75)

- A photopolymerizable compound with at least one ethylenically unsaturated bond (column 12, lines 29-42);
- A photopolymerization initiator such as such as a 2,4,5-triarylimidazolyl dimer (column 3, lines 66-69); and

A heterocyclic sensitizing compound selected from: 2,5-diphenylfuran, 2,5-diphenyl-3,4-dimethylfuran, 2,5-diphenyl-3-ethylfuran, 2,5-di(p-methylphenyl)furan, 2,5-di(2,4-dimethylphenyl)furan, 2,5-di(p-butylphenyl)furan, 2,5-di(p-benzylphenyl)furan, 2-phenyl-5-(p-biphenyl)furan, 2,5-di(p-biphenyl)furan, 2-phenyl-5-(α -naphthyl)furan, 2,5-diphenyloxazole, 2,5-diphenyl-3-methyloxazole, 2,5-di(p-isopropylphenyl)oxazole, 1,4-bis(2-(5-phenyloxazolyl))benzene, 1,4-bis(2-(4-methyl-5-phenyloxazolyl))benzene, 2-phenyl-5-(p-biphenyl)oxazole, 2-phenyl-5-(α -naphthyl)oxazole, 2,5-di(α -naphthyl)oxazole, 1,4-bis(2-(5-phenyloxazolyl))naphthalene, 2,5-di(α -naphthyl)-1,3,4-oxadiazole, 2-phenyl-5-(α -naphthyl)-1,3,4-oxadiazole, 2,5-di(p-t-butylphenyl)-1,3,4-oxadiazole, 2,5-di(4-methyl-1-naphthyl)-1,3,4-oxadiazole, 2-phenyl-5-(p-biphenyl)-1,3,4-oxadiazole, 2-(4-biphenyl)-5-(4-t-butylphenyl)-1,3,4-

oxadiazole, and 1,4-bis(2-(5-phenyl-1,3,4-oxadiazolyl))benzene (column 3, lines 31-48). These heterocyclic compounds are used with the initiator to absorb at wavelengths that are not absorbed by the initiator (column 2, lines 17-20). The heterocyclic compounds are useful as light actuated photooxidants ad which can significantly increase the compositions total absorption of usable light during exposure (column 3, lines 57-64) and further provide better optical quality and imaging speed than commercial radiation sources (column 1, lines 44-54).

Therefore, it would have been obvious to one of ordinary skill within the art at the time of the invention to include the uses of a heterocyclic compound as disclosed by Grubb within the light sensitive resin composition of Amanokura et al. to improve optical quality, light absorption and imaging speed.

The binder of Amanokura et al may comprise various components including (meth)acrylic acids and (meth)acrylic acid esters, and is not limited thereto, thus various other known monomers may be included, however the reference does not specifically teach the instantly claimed binder.

As discussed above, the Ohta reference teaches a binder having similar components to that of Amanokura, and further teaches that a styrene may be employed.

Therefore, it would have been obvious to one of ordinary skill within the art at the time of the invention to include the known binder with a styrene as disclosed by Ohta within the light sensitive resin composition of Amanokura et al.

Response to Arguments

4. Applicant's arguments filed 9/10/2008 have been fully considered but they are not persuasive. Applicant argues that Grubb does not disclose the acid value as recited within claims 1-20. Applicant suggests that Ohta teaches away from having acid values higher than 46 KOH/g. However, the acid value as claimed by Ohta still lies within the claimed range of 45-200 mg KOH/g . In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a prima facie case of obviousness exists. *In re Wertheim*, 541 F.2d 257, 191USPQ 90 (CCPA 1976); *In re Woodruff*, 919 F.2d 1575, 16 USPQ2d 1934 (Fed.Cir. 1990).

5. Additionally, even though the acid range as shown in Ohta may be on the lower end of the claimed range, the applicant has not shown within the specification or declaration why the range of 144-200 mg KOH/g is particularly of greater benefit than any composition that has the acid value range of 45 or 46 mg KOH/g.

6. Applicant also argues that there is no reason to combine Ohta and Grubb together. In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, Ohta in view of Grubb, does disclose the claimed binder with an acid value within the claimed ranges. The addition of such heterocyclic sensitizing compounds as disclosed by Grubb would improve sensitivity (therefore calling the heterocyclic compound a "sensitizing

compound, see column 3, lines 49-65) of the resist as well as limiting contamination by maintaining the claimed acid value. For this reason, it would be obvious for one of ordinary skill to include the heterocyclic compound as disclosed by Grubb within the composition of Ohta to obtain such results.

Applicant has also argued that the references of record fail to employ a binder as instantly claimed in light of the new amendment. The rejections above have been modified to address these arguments in light of the amendment.

Applicant's amendment has overcome the 112 rejections, and thus they have been withdrawn.

Conclusion

1. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Amanda C. Walke whose telephone number is 571-272-1337. The examiner can normally be reached on M-R 5:30-4.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cynthia Kelly can be reached on 571-272-1526. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Amanda C Walke
Primary Examiner
Art Unit 1795

/Amanda C Walke/
Primary Examiner, Art Unit 1795

Application Number 	Application/Control No.	Applicant(s)/Patent under Reexamination
	10/595,920 Examiner Amanda C. Walke	SAWABE ET AL. Art Unit 1795